

WHAT IS CLAIMED IS:

1. A method of fabricating an integrated optical device having at least one waveguide structure comprising the steps of:
 - a) forming a dielectric film layer on a substrate;
 - b) heating said dielectric film layer;
 - c) pressing said dielectric film layer against a stamp having a pattern of at least one waveguide structure formed thereon;
 - d) compressing said stamp and said dielectric film layer;
 - e) cooling said dielectric film layer; and,
 - f) removing said stamp from said dielectric film layer, thereby producing at least one waveguide structure on said substrate.

2. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 1 wherein said dielectric film layer is formed from an electro-optic polymer.

3. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 1 wherein said dielectric film layer is formed from a dielectric matrix having quantum dots dispersed therein.

4. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 1 further comprising the step of removing excess dielectric material surrounding said at least one waveguide following said step of removing said stamp.

5. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 4, wherein said step of removing said excess dielectric material is performed by wet etching using a buffered HF solution.

6. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 1, wherein said at least one waveguide structure is a substantially straight waveguide.

7. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 1, wherein said dielectric film layer is formed of a polymeric matrix having quantum dots dispersed therein.

8. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 3, wherein said quantum dots are formed from a material selected from the group consisting of Group II-VI semiconductor, lead chalcogenides, and metals having nonlinear susceptibility when introduced into a dielectric host.

9. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 7, wherein said quantum dots are formed from a material selected from the group consisting of Group II-VI semiconductor, lead chalcogenides, and metals having nonlinear susceptibility when introduced into a dielectric host.

10. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 7, wherein said polymeric matrix is a non-linear optical polymer.

11. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 10, wherein said non-linear optical polymer is polyphenylacetylene.

12. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 7 wherein said dielectric film layer is heated to a temperature above the glass transition temperature of said polymeric matrix during formation of said at least one waveguide structure on said substrate.

13. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 7 wherein said quantum dots are formed having a substantially uniform volume.

14. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 7 wherein said quantum dots form at least 60% of the volume of said polymeric matrix.

15. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 7 wherein each said quantum dot comprises a core and a shell surrounding said core.

16. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 1 wherein said dielectric film layer is formed of an electro-optic polymer having a highly polymerizable chromophore in its backbone or side chain.

17. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 1 wherein said step of forming said dielectric film layer on said substrate includes spin-coating said dielectric film layer on said substrate.

18. The method of fabricating an integrated optical device having at least one waveguide structure as recited in claim 1 further comprising the step of heating said stamp prior to said step of compressing said stamp and said dielectric film layer.

19. A method of fabricating an integrated optical device having at least one ring resonator comprising the steps of:

- a) forming a dielectric film layer on a substrate;
- b) heating said dielectric film layer;
- c) pressing said dielectric film layer against a stamp having a pattern of at least one ring resonator formed thereon;
- d) compressing said stamp and said dielectric film layer;
- e) cooling said dielectric film layer; and,
- f) removing said stamp from said dielectric film layer, thereby producing at least one ring resonator on said substrate.

20. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 19 wherein said dielectric film layer is formed from an electro-optic polymer.

21. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 19 wherein said dielectric film layer is formed from a dielectric matrix having quantum dots dispersed therein.

22. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 19 further comprising the step of removing excess dielectric material surrounding said at least one ring resonator following said step of removing said stamp.

23. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 22, wherein said step of removing said excess dielectric material is performed by wet etching using a buffered HF solution.

24. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 19, wherein said dielectric film layer is formed of a polymeric matrix having quantum dots dispersed therein.

25. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 21, wherein said quantum dots are formed from a material selected from the group consisting of Group II-VI semiconductor, lead chalcogenides, and metals having nonlinear susceptibility when introduced into a dielectric host.

26. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 24, wherein said quantum dots are formed from a material selected from the group consisting of Group II-VI semiconductor, lead chalcogenides, and metals having nonlinear susceptibility when introduced into a dielectric host.

27. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 24, wherein said polymeric matrix is a non-linear optical polymer.

28. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 27, wherein said non-linear optical polymer is polyphenylacetylene.

29. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 24 wherein said dielectric film layer is heated to a temperature above the glass transition temperature of said polymeric matrix during formation of said at least one waveguide structure on said substrate.

30. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 24 wherein said quantum dots are formed having a substantially uniform volume.

31. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 24 wherein said quantum dots form at least 60% of the volume of said polymeric matrix.

32. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 24 wherein each said quantum dot comprises a core and a shell surrounding said core.

33. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 19 wherein said dielectric film layer is formed of an electro-optic polymer having a highly polymerizable chromophore in its backbone or side chain.

34. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 19 wherein said step of forming said dielectric film layer on said substrate includes spin-coating said dielectric film layer on said substrate.

35. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 19 further comprising the step of heating said stamp prior to said step of compressing said stamp and said dielectric film layer.

36. The method of fabricating an integrated optical device having at least one ring resonator as recited in claim 19 wherein said stamp further has a pattern of at least one straight waveguide formed thereon.

37. An integrated optical device comprising:

a substrate layer;

a dielectric layer formed on said substrate layer, at least one waveguide structure being formed in said dielectric layer.

38. The integrated optical device as recited in claim 37 wherein said at least one waveguide structure is a substantially straight waveguide.

39. The integrated optical device as recited in claim 37 wherein said dielectric film layer is formed of a polymeric matrix having quantum dots dispersed therein.

40. The integrated optical device as recited in claim 37 wherein said dielectric film layer is formed of a dielectric matrix having quantum dots dispersed therein.

41. The integrated optical device as recited in claim 39 wherein said quantum dots are formed of material selected from the group consisting of Group II-VI semiconductor, lead chalcogenides, and metals having nonlinear susceptibility when introduced into a dielectric host.

42. The integrated optical device as recited in claim 40 wherein said quantum dots are formed of material selected from the group consisting of Group II-VI semiconductor, lead chalcogenides, and metals having nonlinear susceptibility when introduced into a dielectric host.

43. The integrated optical device as recited in claim 39 wherein said polymeric matrix is a non-linear polymer.

44. The integrated optical device as recited in claim 43 wherein said non-linear polymer is polyphenylacetylene.

45. The integrated optical device as recited in claim 39 wherein said quantum dots have a substantially uniform volume.

46. The integrated optical device as recited in claim 40 wherein said quantum dots have a substantially uniform volume.

47. The integrated optical device as recited in claim 39 wherein said quantum dots form at least 60% of said polymeric matrix by volume.

48. The integrated optical device as recited in claim 39 wherein each said quantum dot comprises a core and a shell surrounding said core.

49. The integrated optical device as recited in claim 40 wherein each said quantum dot comprises a core and a shell surrounding said core.

50. The integrated optical device as recited in claim 37 wherein said dielectric film layer is formed of an electro-optic polymer having a highly polymerizable chromophore in its backbone or side chain.

51. The integrated optical device as recited in claim 37 wherein said integrated optical device is a wavelength converter.

52. The integrated optical device as recited in claim 37 wherein said integrated optical device is a modulator.

53. The integrated optical device as recited in claim 37 wherein said integrated optical device is a switch.

54. The integrated optical device as recited in claim 37 wherein said integrated optical device is a router.

55. The integrated optical device as recited in claim 37 wherein said integrated optical device is a wavelength filter.

56. The integrated optical device as recited in claim 37 wherein said integrated optical device is a dispersion compensator.